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ABSTRACT

Education, like other institutions of our society, is susceptible to "future shock", the inadequate preparation for a radically different future. Our nation is on the threshold of an age of scarcity, and the impact on education will be the accelerated demands for educators to justify their use of resources based on impersonal objective criteria. Education's favored past status in the resource allocation process will continue to deteriorate as shrinking funds are allocated to education. However, educators can objectively justify the use of scarce resources by applying economic theory and method. Some standard economic models adaptable to education are: (1) production function (the relationship between input and output), (2) production possibilities model (relationships between alternative products), (3) economies to scale (relationships between cost and the size of the producing unit), (4) labor to capital ratio (amount of labor relative to capital used in the production process), and (5) multiproduct production (simultaneous production of products by the producing unit). Progress in resource allocation problems is evident in needs assessment programs, accountability studies, criterion-referenced instruction, performance objectives, the Coleman Report, and similar studies. Continued and expanded efforts are necessary to immunize education from "future shock". (EA)

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FUTURE SHOCK - EDUCATION 1984
THE ECONOMISTS' VIEWPOINT

JUL 25 1975

Presented by Dr. J. William Hanlon, Dean, School of Business, Madison College, to the General Session, Industrial Arts Division, American Vocational Association, December 1, 1973.

As citizens of this nation, and of the world, we are on the threshold of an age of scarcity. Our future, which is rapidly becoming the present, will be characterized by scarcity relative to our present life styles. We see it coming all around us, even in the most basic areas, namely food and energy. Rapidly inflating prices foretell scarcity in other areas. It is amazing how fast this realization has come upon us in the past 2 or 3 years. In the "Soaring 60's," economists were chastised for not preparing for the age of complete material satisfaction. Far from a state of satisfaction, we now find ourselves anticipating shortages of goods we had learned to take for granted. Suddenly, we are realizing as a nation that our engine of technology cannot continue pouring out goods and services at the rapid and accelerating pace we had grown to expect.

This will, and already is, resulting in widespread infection with the disease known as FutureShock. This is the disease we feel when we do not adequately prepare ourselves for the coming of a radically different future. Many say we are generally ill-prepared emotionally, as individuals and as a society, to cope with scarcity. Some expert futurists have noted that we can expect many different reactions to scarcity.[1] Some will kick and scream and act childish, other will hoard everything in reach while others will remain unaffected.

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We can all see these differences in behavior as we watch ourselves and our neighbors react to the on again-off again gasoline and heating fuel shortgages.

There are many problems associated with developing immunity to future shock. One such problem is demonstrated by a statement attributed to Yogi Berra. Someone asked him how he came upon a particularly shrewd act of strategy in a game. He responded, "You can observe a lot by watching." Unfortunately, we cannot build immunity to future shock by merely watching the past or the present - Rather, we must project ourselves into the unknown future - Our strategies must be based on the unknown!

What does all of this have to do with education? Every institution in society, including education, has the propensity to suffer future shock - those that survive and grow will be those that prepare for change in advance. If education is to maintain and build upon its tremendous accomplishments of the past, it must prepare itself now against shock due to onset of the age of scarcity.

Perhaps the most important impact of the age of scarcity on education will be that society will accelerate its demands that educators justify their use of resources based on impersonal objective criteria. In the developing stages of all modern industrialized societies, education has enjoyed a favored position in the resource allocation process. We educators in the United States certainly have enjoyed the "golden age of education" where, by its very nature, education was deemed "good" for the individual and for society. More education was always preferred to less education.

Until recent years, educators were rarely asked to measure output and performance as they requested and obtained more and more public and private resources. The 1950's and 60's was an era of unprecedented innovation and expansion in education, but few are convinced that it was a decade of unprecedented accomplishment. Spending on education grew nearly 200% in the 1960's. Grant Venn has said that education is one of the few productive enterprises where accomplishment is measured on the bas,s on input rather than on the basis of ouput.[2] "Better" education has been implied by greater expenditure per pupil, more teacher per pupil etc. This is ridiculous. It is like Sears trying to sell a lawn mower by advertising that it has $79.99 worth of materials, labor and profit in it, rather than by telling what the performance standards of that mower are.

In the age of scarcity, the favored status enjoyed by education in the resource allocation process will continue to deteriorate. The Coleman study, a landmark in educational research and as the most extensive search for relationships between educational inputs and student achievement, concluded that the data showed little relationship between educational facilities and student achievement.[3] Like the lawn mower salesman, we as educators are approaching the point where we will have to answer society's question of "how much more education will the $100.00 brand give us as compared with the $79.00 brand? In the age of scarcity, our answer can no longer be "$21.00 worth." Rather it must be in terms of some measure of output and performance.

As a professional economist, it seems that economic theory and method can make a significant contribution to providing such measures. After all,

economics is based on the assumption of scarcity. The very foundations of economics are predicated upon the assumption that man's wants are unlimited, while his resources are limited, hence the need arises for every society to somehow allocate scarce resources among unlimited wants. Perhaps this is why economics is called the dismal science - It deals with the dismal prospect that we cannot have everything we might want. Economic theory and method can provide the framework by which educators can objectively justify the use of scarce resources in the age of scarcity. It is good to see that the NIE has recognized this potential by encouraging economics studies in some of its grants programs.

Now, let's take a brief look into the economist's bag of theory and method. What does it contain that might help to immunize education from future shock? That bag is filled with theoretical models which are skeletal representations of real world phenomena. A model includes a few basic components abstracted from the real world, and a set of relationships between the components. It provides an orderly way of studying and understanding complex phenomena. Once built, the model can be cranked up and observations can be taken on its structure and output. These observations lead to generalizations about the real world phenomenon it represents.

The model, if correctly structured and quantified provides a way of looking into the future. Projected components and relationships can be inserted in the model and the net effect of all of these acting simultaneously can be observed. New programs can be tried out in the context of the model to obtain estimates of impact.

Actually, there is nothing terribly profound about this. All of us tend to think in terms of models as we ponder the unknown. All I am saying here is that economists have reached a rather high level of order and sophistication in the building and analysis of models, so there is no need for educators to reinvent this particular wheel.

Many economic models have already been adapted to educational phenomena, especially in finance. An example of this is the investment model or the rate of return model, where education is viewed as a capital good representing cost during its consumption, but briging social profits or benefits at a later time.[4] By relating benefits to cost, it is possible to work out a rate of return which may be compared to returns from other possible investments. This model might be used, for example, to compare cost and benefits of investment in secondary general education with investment in secretarial and vocational education to determine which is the "best buy" for the taxpayer.

Some standard economic models that are adaptable to educational phenomena are:

1. Production Function: This is the relationship between input and output. If we add a dollar of expenditure to vocational programs, and take it away from social science, what will be the net effect on output? Or, what are the relative benefits of spending another dollar on textbooks rather than on in-service teacher training? The production function model can provide a framework for studying these questions.

2. Production Possibilities Model: This refers to relationships between alternative products. How much vocational education must be sacrificed in order to add a unit of fine arts education, assuming no change in the total amount of resources used?

3. Economies to scale: This refers to relationships between cost and the size of the producing unit. Does average cost per unit of output rise fall or stay the same as size increases.

4. Labor to capital ratios: This refers to the amount of labor relative to capital used in the production process. As the price of labor (teachers) goes up, the taxpayer gets more for his dollar by shifting to more capital and less labor. What is the optimal ratio of labor to capital? These are key questions to be answered as we see more equipment alternatives for teaching, and as the price ratio between labor and capital changes.

5. Multi-product production: In education, as in many industrial production processes, many products are produced simultaneously by the producing unit. Products might be identified within the cognitive domain, affective domain, psycho-motor domain, etc. What is the optimal mix of products? Many economic models are addressed to this question in industry settings.

These are just a few of the economic models that might be adapted to educational phenomena to get answers to questions being asked in the age of scarcity.

In order to use these models for decision making we need numerical data that measure inputs and outputs. Numerical relationships must be established between output, i.e. student behavior, on the one hand, and inputs including teacher training, multi-media laboratories etc. We must be able to estimate the effect of a dollar spent on in-service training compared with a dollar spent on a multi-media laboratory.

Tremendous progress has been made in this area in recent years. Teachers and administrators are steeped in the concept of measurable behavioral objectives. Many have studied and worked on needs-assessment programs, accountability studies, criterion referenced instruction, performance objectives and other concepts that require measurement of relationships

between input and output. The Coleman Report and others have given insights into the numbers that are needed to cope with resource allocation problems.[4]

Increased expenditures in the last three decades were justified by growing enrollments alone. This luxury of growth is no longer with us, so hard questions arise as shrinking funds are allocated within education. Taxpayers are demanding objective justification for such decisions. These justifications must be based on cost benefit analyses that enable clear comparisons of alternative ways of spending the education dollar.

Economists and educators working together can develop procedures to objectively analyze input/output relationship within education. A good start has been made as such work as progressed in many schools and colleges across the country. This work must continue and expand in an effort to immunize education from Future Shock.

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1. Douglas S. Looney, "The Age of Scarcity", National Observer, November 3, 1973.

2. Personal conversation

3. James S. Coleman, et. al., Equality of Educational Opportunity. Washington, D. C., U.S. Government Printing Office, 1966.

4. For a discussion of this see Don Adams, "Economic Models, Planning and Educational Decisions," Theory Into Practice, February 1973, 59+